



**Quantitative Literacy
Content Standards – Act 480
2017**

Course Title: Quantitative Literacy
 Course/Unit Credit: 1
 Course Number: 439120
 Teacher Licensure: Please refer to the Course Code Management System (<https://adedata.arkansas.gov/ccms/>) for the most current licensure codes.
 Grades: 9-12
 Prerequisite: Algebra 1

Course Description: This course builds on Algebra I to explore mathematical topics and relationships. Emphasis will be placed on applying modeling as the process of choosing and using appropriate mathematics and statistics to analyze, to better understand, and to improve mathematical understanding in real world situations. Students will represent and process their reasoning and conclusions numerically, graphically, symbolically, and verbally. Quantitative Literacy will help students develop conceptual understanding by supporting them in making connections between concepts and applying previously learned material to new contexts. Students will be expected to use technology, including graphing calculators, computers, or data gathering tools throughout the course. Quantitative Literacy does not require Arkansas Department of Education approval.

Notes:

1. Teacher notes offer clarification of the standards.
2. All items in a bulleted list must be taught.

Quantitative Literacy

Strand	Content Standard
Modeling	1. Students will use appropriate mathematical models to solve problems.
Numerical Reasoning	2. Students will use number sense and proportional reasoning in real world settings to make and communicate decisions in order to draw conclusions based on quantitative analysis.
Statistics and Probability	3. Students will apply statistical and probabilistic reasoning to draw conclusions, to make decisions, and to evaluate outcomes of decisions.
Personal Financial Literacy	4. Students will apply mathematics to make informed personal financial decisions.
Business Financial Literacy	5. Students will understand the principles and mathematics in business as it applies to economics.

Strand: Modeling

Content Standard: 1. Students will use appropriate mathematical models to solve problems.

M.1.QL.1	Demonstrate understanding of the meaning of a solution and identify when insufficient information is given to solve a problem
M.1.QL.2	Analyze mathematical models, describe limitations, and suggest improvements
M.1.QL.3	Use mathematical models created with spreadsheets or other tools to <ul style="list-style-type: none">• estimate solutions for contextual questions• identify patterns• identify how changing parameters affect results
M.1.QL.4	Use mathematical models to make decisions about purchases (e.g., buying a vehicle, home improvement, fashion trends) Personal Finance Alignment: <i>PF.4.C.3 Compare and contrast the advantages and disadvantages of renting versus owning a home (e.g., costs, taxes, insurance)</i>
M.1.QL.5	Create and use mathematical models for bivariate data sets to <ul style="list-style-type: none">• answer questions• draw conclusions• make decisions

Strand: Numerical Reasoning

Content Standard: 2. Students will use number sense and proportional reasoning in real world settings to make and communicate decisions in order to draw conclusions based on quantitative analysis.

NR.2.QL.1	Solve real world problems and interpret results involving calculations with percentages, decimals, and fractions <ul style="list-style-type: none">• conversions• percent change (absolute vs relative)• percent of quantities
NR.2.QL.2	Use estimation in real world situations <ul style="list-style-type: none">• know when• know how• know why
NR.2.QL.3	<ul style="list-style-type: none">• Identify appropriate numeric benchmarks (e.g., use 10% as an estimation for 12%) for estimating calculations• Identify appropriate contextual benchmarks (e.g., population for Arkansas, the United States, and the world) to compare to other numbers (e.g., reasonableness of statistical claims, giving context to numbers)
NR.2.QL.4	Compare magnitudes of numbers in context in different forms (e.g., millions, billions, trillions, national debt, Richter scale, scientific notation)
NR.2.QL.5	Use dimensional analysis to solve problems involving multiple units of measurement (e.g., converting between currencies, determine miles per gallon, appropriate dosages of medicine)
NR.2.QL.6	Solve real world problems requiring interpretation and comparison of various representations of rates and ratios
NR.2.QL.7	Distinguish between proportional and non-proportional real world situations

Strand: Statistics and Probability

Content Standard: 3. Students will apply statistical and probabilistic reasoning to draw conclusions, to make decisions, and to evaluate outcomes of decisions.

SP.3.QL.1	Create and use charts, tables, and graphs of real world data (with and without technology)
SP.3.QL.2	<ul style="list-style-type: none"> Analyze charts, tables and graphs of real world data Interpret charts, tables and graphs of real world data Compare charts, tables and graphs of real world data
SP.3.QL.3	Analyze statistical information from studies, surveys, and polls to make informed judgements as to the validity of claims or conclusions (e.g., bias, limitations, sampling, causation vs correlation, misuse of statistics)
SP.3.QL.4	<p>Make decisions about data summarized numerically using measures of center</p> <ul style="list-style-type: none"> compare measures of center of two or more data sets interpret the differences in context justify the use of a chosen measure <p>Teacher Note: A discussion of variability and outliers would be appropriate.</p>
SP.3.QL.5	<p>Use probabilities to make and justify decisions about risks in everyday life (e.g., types of investments, taking medication, selecting car insurance, playing the lottery)</p> <p>Personal Finance Alignment: <i>PF.6.I.1 Analyze the need for insurance in managing risk and how risk affects cost</i></p>
SP.3.QL.6	Evaluate the validity of claims based on experimental and theoretical probabilities
SP.3.QL.7	<p>Apply rules of counting and probability to compute probabilities of compound real world events</p> <ul style="list-style-type: none"> addition rule multiplication rule Fundamental Counting Principle permutation and combinations visual representations (e.g., Venn diagrams, tree diagrams, lists, two-way tables)

Strand: Personal Financial Literacy

Content Standard: 4. Students will apply mathematics to make informed personal financial decisions.

PF.4.QL.1	<p>Represent and analyze mathematical models for various types of income (e.g., commission, salary, hourly wage, overtime)</p> <p>Personal Finance Alignment: <i>PF.2.EI.1 Compare and contrast the methods by which employees are paid (e.g., direct deposit, paper check, payroll card)</i> <i>PF.2.EI.3 Analyze differences among salary, hourly, commission, and overtime pay</i></p>
PF.4.QL.2	<p>Represent and analyze various types of income deductions (e.g., federal and state income taxes, Social Security, Medicare taxes, pre-tax deductions) and employment forms (W-2, W-4, I-9)</p> <p>Personal Finance Alignment: <i>PF.2.EI.2 Represent and analyze various types of income deductions and how they impact income (e.g., payroll taxes, deductions, gross pay, net pay)</i> <i>PF.2.EI.4 Complete work related forms</i> <ul style="list-style-type: none"> • <i>W4</i> • <i>I9</i> • <i>Medical Forms</i> • <i>Life Insurance Forms</i> • <i>Retirement Forms</i> </p>
PF.4.QL.3	<p>Analyze expenses to create a household budget utilizing food, shelter, transportation, utilities, insurance, savings, and other expenses (charitable giving)</p> <p>Personal Finance Alignment: <i>PF.5.MM.4 Analyze expenses to create a household budging including, but not limited to, housing, utilities, food, saving, insurance, taxes, and charitable giving</i> <i>PF.6.I.2 Investigate the relationship between insurance premiums and deductibles</i> <i>PF.6.I.3 Evaluate auto insurance options and factors affecting cost of coverage including split limit</i> <i>PF.6.I.4 Assess health related insurance options and types of coverage (e.g., health, dental, vision, stroke/heart disease, cancer, accident, short-term/long-term disability, long-term care)</i> <i>PF.6.I.5 Analyze various types of life insurance (e.g., term, whole)</i> <i>PF.6.I.6 Investigate property insurance and potential riders including, but not limited to, homeowner's renter's, and mortgage</i> <i>PF.7.SI.6 Interpret the role of goal setting as an integral part of financial planning and construct a well written goal</i></p>

PF.4.QL.4	<p>Analyze various investment instruments for</p> <ul style="list-style-type: none"> • purposes • advantages • disadvantages • risks <p>(e.g., savings, checking accounts, certificates of deposit, stocks, social security, individual retirement accounts, bonds, annuities)</p> <p>Personal Finance Alignment:</p> <p><i>PF.5.MM.1 Compare types of banking institutions including products and services available</i></p> <p><i>PF.5.MM.2 Explore the process of opening and managing different types of accounts (e.g., checking, savings)</i></p> <p><i>PF.5.MM.3 Analyze the advantages and disadvantages of various retirement plans (e.g., pension, 401K, IRA, social security)</i></p> <p><i>PF.5.MM.5 Examine the influences on financial planning decisions (e.g., needs vs. wants, priorities, values, stages of life, estate planning)</i></p> <p><i>PF.7.SI.5 Compare the characteristics of saving tools (e.g., liquidity, interest rates, term length) to determine how to best meet a financial goal</i></p> <p><i>PF.7.SI.7 Research different types of investments and consider the importance of diversification</i></p> <ul style="list-style-type: none"> • Annuities • Bonds • Money Market Funds • Mutual Funds • Real Estate • Stocks <p><i>PF.7.SI.8 Understand the regulation of savings and investments</i></p>
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PF.4.QL.5	<p>Analyze the characteristics of various types of loans (e.g., credit cards, personal loans, student loans, auto financing, mortgages)</p> <p>Personal Finance Alignment:</p> <p><i>PF.4.C.5 Understand different components of credit by</i></p> <ul style="list-style-type: none"> • Comparing and contrasting sources of credit (e.g., car loans, student loans, credit cards) • Discussing the establishment and use of credit • 3FIdentifying the factors that contribute to a credit score • Calculating the actual costs associated with credit • Discussing methods of solving credit problems • Evaluating the risks associated with overextending credit <p><i>PF.4.C.7 Understand the different components of loans by</i></p> <ul style="list-style-type: none"> • Differentiating between the different types of loans (e.g., payday, auto, home, personal, student) • Examining the lending process from application to approval • Calculating true costs associated with loans (e.g., term length, interest rate) • Understanding the factors that contribute to different interest rates • Evaluating the implications of obtaining and/or defaulting on a loan
PF.4.QL.6	<p>Apply appropriate models to determine the impact of the relationship among loan rates, the term of a loan, the principle amount of a loan, and payments (e.g., amortization table, spreadsheet, compound interest, annual interest rates, continuous rates)</p> <p>Personal Finance Alignment:</p> <p><i>PF.4.C.4 Analyze factors that determining/influence mortgage costs (e.g., interest rate, term length, credit rating)</i></p> <p><i>PF.4.C.5 Understand different components of credit by</i></p> <ul style="list-style-type: none"> • Comparing and contrasting sources of credit (e.g., car loans, student loans, credit cards) • Discussing the establishment and use of credit • 3FIdentifying the factors that contribute to a credit score • Calculating the actual costs associated with credit • Discussing methods of solving credit problems • Evaluating the risks associated with overextending credit <p><i>PF.7.SI.1 Compare the effects of interest rates as applied to saving and borrowing money</i></p> <p><i>PF.7.SI.2 Examine how consumers are affected by raising and lowering interest rates</i></p> <p><i>PF.7.SI.3 Calculate simple and compound interest and explain the difference between the two</i></p> <p><i>PF.7.SI.4 Analyze the relationship between risk and return</i></p>

PF.4.QL.7	<p>Examine consumer protection, bankruptcy, and debt and credit management services for ways in which they affect household budgeting</p> <p>Personal Finance Alignment:</p> <p><i>PF.4.C.1 Identify types of fraud and credit abuse and develop strategies to protect oneself from identity fraud and theft</i></p> <p><i>PF.4.C.2 Discuss common crimes against consumers and examine federal consumer protection laws</i></p> <p><i>PF.4.C.6 Understand the different components of bankruptcy by</i></p> <ul style="list-style-type: none"> • <i>Identifying and evaluating types of bankruptcy</i> • <i>Examining the impact of declaring bankruptcy and how it may affect future financial opportunities</i>
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Strand: Business Financial Literacy

Content Standard: 5. Students will understand the principles and mathematics in business as it applies to economics.

BF.5.QL.1	Use real world data to determine how a product or service can be profitable in a community
BF.5.QL.2	Determine fixed and variable expenses of running a business (e.g., startup costs, inventory, construction permits, salaries, equipment, taxes, advertisement)
BF.5.QL.3	<p>Calculate indices and solve problems using common indices</p> <ul style="list-style-type: none"> • consumer price index • cost of living index • determine what constitutes an index <p>Teacher note: Discussion may include why BMI is not an index.</p>
BF.5.QL.4	Analyze how stock market averages and indices are calculated (e.g., Dow Jones, NASDAQ, S&P 500)
BF.5.QL.5	<p>Calculate how inflation changes the value of the dollar over time</p> <p>Teacher note: Discussion may include percentage change with assumed fixed rate or historical variable rates.</p>
BF.5.QL.6	<p>Prepare for employment by analyzing job skills (e.g., resume building, communication, time management, employer expectations and requirements)</p> <p>Personal Finance Alignment:</p> <p><i>PF.1.EI.1 Explain factors that influence career and job selection</i></p> <p><i>PF.1.EI.2 Determine ways to locate and apply for a job by</i></p> <ul style="list-style-type: none"> • Completing a job search in an area of interest • Completing a job application, cover letter, resume, and follow-up letter <p><i>PF.1.EI.3 Evaluate ways to make a positive impressions during a job interview</i></p> <p><i>PF.1.EI.4 Compare job offers for employee benefits (e.g., time, income, insurance, retirement)</i></p> <p><i>PF.1.EI.5 Summarize skills needed to be successful in the workplace</i></p> <ul style="list-style-type: none"> • Communication • Time Management • Basic Employer Expectations <p><i>PF.3.CCP.1 Explore potential careers (including an employment forecast) and the steps needed to achieve them based on interests and/or talents</i></p> <p><i>PF.3.CCP.2 Explore opportunities for internships, job shadowing, and real-world experiences to determining future career paths</i></p> <p><i>PF.3.CCP.3 Develop a flowchart to outline the steps needed to achieve chosen career paths (e.g., trade school, associate's degree, bachelor's degree, master's degree, doctorate)</i></p>